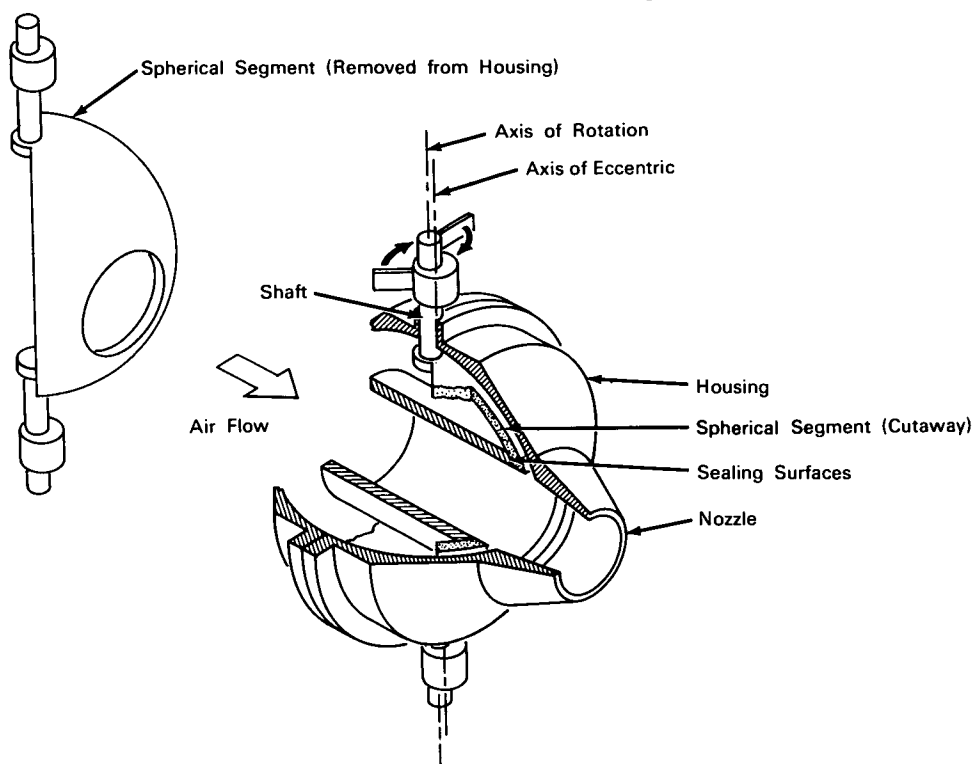


# NASA TECH BRIEF



This NASA Tech Brief is issued by the Technology Utilization Division to acquaint industry with the technical content of an innovation derived from the NASA space program.

## High-Temperature, High-Pressure Spherical Segment Valve Provides Quick Opening



**The problem:** To design a valve for air, or other gas, which would provide quick opening at valve discharge pressures up to 2,000 psig and temperature up to 2,500°F.

**The solution:** A special hollow spherical segment valve with an eccentric which permits non-rubbing closure and provision of a means for gas-cooling of the seal.

**How it's done:** The hollow spherical segment is rotated into and out of the air stream by a hydraulic

cylinder (not shown) and an arm attached to the shaft on which the segment is mounted. An eccentric, actuated by a second hydraulic cylinder (also not shown), provides a non-rubbing action by creating a one-eighth-inch free space between the sealing surfaces before the segment is rotated into seating position. The creation of this one-eighth-inch space serves to shift the pressure load from the valve body to the segment shaft bearing, making rapid operation possible. The area around the seal is gas-cooled to permit

(continued overleaf)

operation at high temperature.

**Notes:**

1. The non-rubbing seals should make this type of high-pressure valve useful in controlling the flow of abrasive slurries and in applications where large-bore, fast-response valves are required.
2. This valve is capable of being operated from closed to open condition at low pressure drops (up to 400 psig).
3. A large valve of this type (throat diameter 22 inches) was specially built for installation at the outlet of a pebble-bed heater ahead of a hypersonic

wind-tunnel test nozzle and incorporates a number of costly features.

**Patent status:** NASA encourages the immediate commercial use of this invention. It is owned by NASA, and a patent application has been filed. When patented, royalty-free non-exclusive licenses for its commercial use will be available. Inquiries concerning license rights should be made to NASA Headquarters, Washington, D.C. 20546.

Source: A Giovannetti, R. Himmelright, H. Nitta,  
and K. Meyer  
Ames Research Center (ARC-13)